

REMARKS

Claims 3 and 6-48 are presently pending in this application. Claims 1, 2, 4 and 5 have been cancelled without prejudice in this paper, and claims 12-48 have been added to the application as set forth above. Claims 1, 2, 4 and 5 have been cancelled without prejudice to pursue different subject matter based on market conditions. The applicants and assignee of the present application accordingly do not surrender the subject matter of the cancelled claims and specifically reserve the right to pursue such subject matter at a later point in this application or a continuation application. Claims 7-9 and 11 have been amended in this paper to correct a minor typographical error unrelated to patentability.

Claims 1-11 were rejected under various grounds in the Office Action dated April 20, 2004. More specifically, the claims were rejected as follows:

(A) Claims 1-11 were rejected under the doctrine of obviousness-type double patenting as being patentable over (1) claims 1-53 of U.S. Patent No. 6,632,334 in view of U.S. Patent No. 6,318,951, or (2) claims 1-42 of U.S. Patent No. 6,699,373 in view of U.S. Patent No. 6,318,951.

(B) Claims 1-4 and 6 were rejected under 35 U.S.C. § 102(b) as being anticipated by the text on pages 5-8 and Figure 1B of the present application (the "Background Disclosure").

(C) Claims 5 and 9 were rejected under 35 U.S.C. § 103 over the combination of the Background Disclosure and U.S. Patent No. 6,391,166 issued to Wang ("Wang").

A. Response to Obviousness-Type Double Patenting Rejections

Claims 1-11 were rejected under the doctrine of obviousness-type double patenting over two separate combinations of patents involving U.S. Patent Nos. 6,632,334; 6,699,373; and 6,318,951. Although the applicants do not concede that the pending claims in this application are obvious over the claims of the applied patents, two Terminal Disclaimers that obviate this rejection are enclosed with this paper. Therefore, the obviousness-type double patenting rejections should be withdrawn.

B. Response to Section 102 Rejection

Claims 1-4 and 6 were rejected under 35 U.S.C. § 102 over the Background Disclosure. In rejecting these claims, the Examiner asserts that the Background Disclosure discloses a tool having a cabinet with an interior enclosure and a plurality of electrochemical processing stations that each comprise a "reaction vessel . . . having a plurality of electrodes (i.e., at least one anode and one cathode)." The Examiner also asserts that the Background Disclosure further discloses a "controller" that would provide a "different electrical current to each of the electrodes."

1. The Characterization of the Background Disclosure in the Office Action Is Incorrect and Cannot Stand as the Basis for Rejecting Claims 1-4 and 6 Under Section 102

The assertion that the Background Disclosure discloses a reaction vessel having a container and "a plurality of electrodes (i.e., at least one anode and cathode)" in the container is incorrect. The LT-210C plating tool illustrated in Figure 1B was developed by Semitool, Inc., which is also the assignee of the present application, and thus the present applicant and not the Examiner should be relied upon to characterize what this tool included. The LT-210C includes a plurality of processing stations or chambers 20 within a housing or cabinet. Each of the processing chambers includes a head assembly and a reaction vessel with a container separate from the head assembly. Contrary to the characterization of this apparatus in the Office Action, the reaction vessel has a single electrode (i.e., the anode) in the container and the head assembly has a contact ring defining the other electrode (i.e., the cathode). When the head assembly lowers a workpiece into the reaction vessel, the cathodic ring contact of the head assembly may be within the reaction vessel temporarily, but the cathodic ring contact electrode is a component of the head assembly as opposed to being a component of the reaction vessel. The Background Disclosure accordingly does not disclose a reaction vessel having a container and a plurality of "electrodes" in the container as asserted by the Examiner. Therefore, even though claims 1, 2, 4 and 5 have been cancelled from this application, these claims are patentable over the Background Disclosure because these claims included a plurality of separate electrodes in the container of the reaction vessel.

The assertion that the Background Disclosure further includes a controller which provides a different electrical current to each of the electrodes in a reaction vessel container is also incorrect. The apparatus illustrated in Figure 1B has a controller that provides the output from a power supply to the single anodic electrode in each plating chamber and the corresponding cathodic contact ring attached to the head assembly. The controller of the apparatus shown in Figure 1B does not provide a different electrical current to more than one electrode in an individual container because the individual reaction vessel containers have only a single electrode. Therefore, the characterization that the controller would "provide a different electrical current to each of the electrodes" in a reaction vessel container is incorrect. Thus, even though originally filed claim 2 has been cancelled from the application, this claim was further patentable over the Background Disclosure.

2. Claim 3 Is Patentable Over the Background Disclosure Because Claim 3 Includes a Lift-Rotate Assembly Having a Housing Rotatably Coupled to an External Portion of the Frame to Tilt Outward Relative to the Frame

Claim 3 is directed toward a tool having a cabinet including a frame and panels that define an interior enclosure. The tool in claim 3 further includes a (a) lift/rotate assembly comprising a housing "rotatably coupled to an external portion of the frame to tilt outward relative to the frame," and (b) a head assembly carried by the lift/rotate assembly. The lift/rotate assembly recited in claim 3 is rotatably attached to an external portion of the frame so that it occupies less space in the interior of a cabinet. This reduces the footprint of the tool and/or provides more space for larger processing stations. Another aspect of the lift/rotate assembly is that it provides easy access to the mechanical and electrical components of the lifting and rotating mechanisms without having to remove the lift/rotate assemblies from the tool. The lift/rotate assemblies also provide easy access to reaction chambers and other components in the cabinet because they can be tilted outward without having to be removed from the cabinet. This accordingly reduces the time and effort to service components of the chambers inside the cabinet.

The Background Disclosure as shown in the apparatus in Figure 1B does not disclose a lift/rotate assembly having a housing rotatably coupled to an external portion of the frame to tilt outward relative to the frame. Instead, the lift/rotate assemblies illustrated in Figure 1B are mounted in the interior of the cabinet and do not tilt outward relative to the frame. The Examiner asserts that Figure 1B "appears" to disclose the upper and lower compartment with the door received in the opening of the lower panel of the cabinet. This assertion by the Examiner is irrelevant with respect to the subject matter of claim 3 because it still does not disclose a lift/rotate assembly having a housing rotatably coupled to an external portion of the frame to tilt outward relative to the frame. Therefore, claim 3 is patentable over the Background Disclosure.

3. Claim 6 Is Patentable Over the Background Disclosure Because This Reference Fails to Disclose or Suggest a Field Shaping Unit in the Reaction Vessel Container and a Plurality of Electrode Compartments That Each Contain an Electrode in the Reaction Vessel Container

Claim 6 is rejected under 35 U.S.C. § 102 over the Background Disclosure, but the Office Action fails to set forth any grounds to support the rejection of this claim. For example, claim 6 includes first and second reaction vessels that each comprise a container, a field shaping unit in the container, electrode compartments, and separate electrodes in which each electrode compartment contains one of the electrodes. The Examiner does not specifically state that the Background Disclosure discloses these features. The rejection of claim 6 under Section 102 over the Background Disclosure accordingly appears to be an oversight. Therefore, claim 6 is also patentable over the Background Disclosure.

C. Response to Section 103 Rejection

Claims 5 and 9 were rejected under 35 U.S.C. § 103 as being unpatentable over the combination of the Background Disclosure and Wang. Claim 5 has been cancelled from the present application, and thus the following remarks are directed toward the rejection of claim 9.

Claim 9 is directed toward a tool for electrochemical processing of microelectronic workpieces. One feature of claim 9 is an electrochemical processing

station comprising a reaction vessel having a container, a plurality of electrodes in separate electrode compartments in the container, and at least one interface member coupled to at least one of the electrode compartments between the corresponding electrode and a workpiece processing site. The interface member is configured to prevent selected matter from passing from the electrode compartment to the workpiece processing site. For example, the interface member can be a filter that removes very small particulate matter and bubbles from the processing solution, or the interface member can be an ion-membrane that only allows selected ions to pass through to the workpiece processing site.

Claim 9 is patentable over the combination of the Background Disclosure and Wang because this combination of references fails to disclose or suggest several features of claim 9. For example, the Background Disclosure and Wang fail to disclose or suggest an interface member configured to prevent selected matter from passing out of the electrode compartment to the processing site. The Background Disclosure is completely silent with respect to interface members for filtering particulates or controlling the ion exchange between the electrode compartments and the workpiece processing site. Wang is similarly silent with respect to any such interface member. For example, the embodiment shown in Figure 17 of Wang merely includes a plurality of diffuser rings 110 and 112 that can be holes punched in a plate or a porous material having 10-90% porosity. The diffuser rings in Wang may condition the direction of the processing solution flow, but with such high levels of porosity they are not filters or ion-membranes that prevent matter from passing to the workpiece processing site. Therefore, claim 9 is patentable over the applied references under Section 103.

D. Claims 7, 8, 10 and 11

Originally filed claims 7, 8, 10 and 11 were rejected only under the doctrine of obviousness-type double patenting. Because these claims were not rejected over prior art, these claims should be allowed in light of the Terminal Disclaimers enclosed with this paper.

E. New Claims

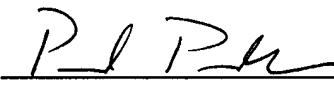
Claims 12-48 are added to the present application in this paper. The subject matter of each of these claims is fully supported by the specification and the figures of the originally filed application. Additionally, independent claims 12, 23, 32 and 43 are directed toward different aspects of electrochemical processing tools involving multiple electrodes in reaction vessels and/or interface members in reaction vessels.

F. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and patentably define over the applied art. The applicants respectfully request reconsideration of the application and a timely mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3258.

Respectfully submitted,
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